Sri Muthu Narayanan Balasubramanian

Personal Data

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Work Experience

Current July 2013	Associate Engineer at Caterpillar Inc., Chennai *Electronics and Systems Integration Division - India*
May 2012	Summer Intern at Insystronics Technologies, Chennai *Embedded product design company* Worked on a prototype Tire Pressure Monitoring System (TPMS) for budget cars in association with a team from TATA ELXSI.

Education

2009-2013	B.E in Electrical and Electronics Engineering , **College of Engineering Guindy (CEG)**, Anna University, Chennai **First class** with Gpa: 8.2/10
2007-2009	Higher Secondary Education , Tamil Nadu Board of Higher Secondary Education SRV Boys Higher Secondary School, Namakkal **First Class** with **Distinction** (Aggregate of 97.58%)

Test Scores

Aug 2014	**Graduate Records Examination (GRE)** Quantitative Reasoning: 167 Verbal Reasoning: 162 Analytical Writing: 5.0
Aug 2014	**TOEFL (iBT)** Reading: 29 Listening: 30 Speaking: 28 Writing: 30 Total: 117

Projects

Caterpillar

Primary Display Module Application development   Aug '13 till date

- Working on Application source code development in Embedded C for Primary Display ECU (Electronic Control Unit) for Articulated Trucks and Motor graders.
- Currently working on implementation of calibration protocol for Motor Graders.

Data Link simulator for Hardware-In-Loop (HIL) simulations   Jan '14 till date

- Currently working on the research project in developing customized data link simulator with multiple protocol support (including CAN/J1939 public and proprietary protocols) for HIL simulations during development and testing of ECUs.
- Working on the implementation using Zero Message Queue (ZMQ) high performance asynchronous messaging library.

Display ECU Test automation Jan '14 till date

- Spearheaded the project for automation of the HIL testing of Display ECUs.
- Onscreen data capture and validation implemented using customized OCR software.
- 80% increase in quality and velocity of testing process resulting from the elimination of human effort from the test bench.

Senior Year Thesis

Condition monitoring and fault diagnosis of Induction motors May '13

- Sensor data acquisition, Feature extraction and trend analysis for fault prediction in industrial induction motors.
- Cost effective monitoring and proactive warning system to minimize downtime.
- Secured "S" grade (10/10 points) for the project.

Self Funded Projects

Rubik's cube solver Dec '12

- An autonomous solver that can mechanically solve a 3x3 Rubik's cube..
- Designed and built the setup using three individual 2-DOF servo manipulators.
- The algorithm was implemented using OpenCV on the RaspberryPi board.

Self adjusting podium microphone Nov '12

- Designed and built a low-cost self adjusting podium microphone.
- Implemented the face detection and tracking using Haar cascades in OpenCV on the RaspberryPi processor board.

Automated 4-DOF Robotic Arm Sep '12

- Dynamic model was created using SIMULINK and the position data for the servo motors were wirelessly transmitted to the Arduino controlled robotic arm.
- The fully automated arm can draw basic shapes and alphabets.

Sponsored Projects

Automated Guided Vehicle Feb '11
(Funded by CEG Tech forum - the Mega project during Kurukshetra 2011)

- A fully autonomous, self-guided industrial robot for industrial applications.
- Worked on the design of electronics and path planning algorithm.

Line Follower with vision based obstacle avoidance Oct '10
(University Grants Commission sponsored project)

- An autonomous line follower robot with camera module for obstacle avoidance.
- Image processing for obstacle avoidance was implemented using MATLAB.

Technical Skills

Simulation & modeling:	MATLAB, Vector Tools (CANalyzer/CANoe)
Programming:	C, C++, VBA, Python, Java, Embedded C, HTML5
Platforms:	Windows, Linux (Ubuntu), WinCE
Miscellaneous:	Pspice, DesignSpark PCB, OpenCV, NI Vision, LaTeX, SMD Soldering

Areas of interest

Embedded systems and software
Intelligent Transportation systems
Computer Vision
Robotics, Control and automation

Organizational roles

- **Co-founder of Illuminati**, a tech hub for spreading technical knowledge through workshops.
- **President** of The Robotics Club of CEG.
- **Student Director** at the CEG Tech Forum.
- **Secretary** of Sruthilaya, the light music orchestra of CEG.

Awards and achievements

- Recipient of **Government of India Scholarship** throughout under graduate course for ranking within the top 0.1 percentile of the state's high school board exam.
- Ranked in the top 0.02% of TamilNadu Engineering admission applicants in 2009.
- Received the Medal of Honor for securing 100% score in higher secondary Mathematics and Physics examinations.
- Competitively awarded the sponsorship for a project during second year by The University Grants Commission (UGC).
- Winner of various robotics and circuit debugging contests at National level technical symposiums around the country.

Other skills and activities

- Holder of **Performer's Certificate** (Grade 7) in Digital Keyboard, **Trinity College of music**, London.
- Trained **6 Sigma Green Belt**.
- Trained in AGILE Mindset and Practices.
- Volunteer at Chinmaya Mission, an international socio-cultural non-profit organization.
- One of the founders of a **social initiative** called ”Mithr” at Caterpillar, providing academic support to underprivileged children.